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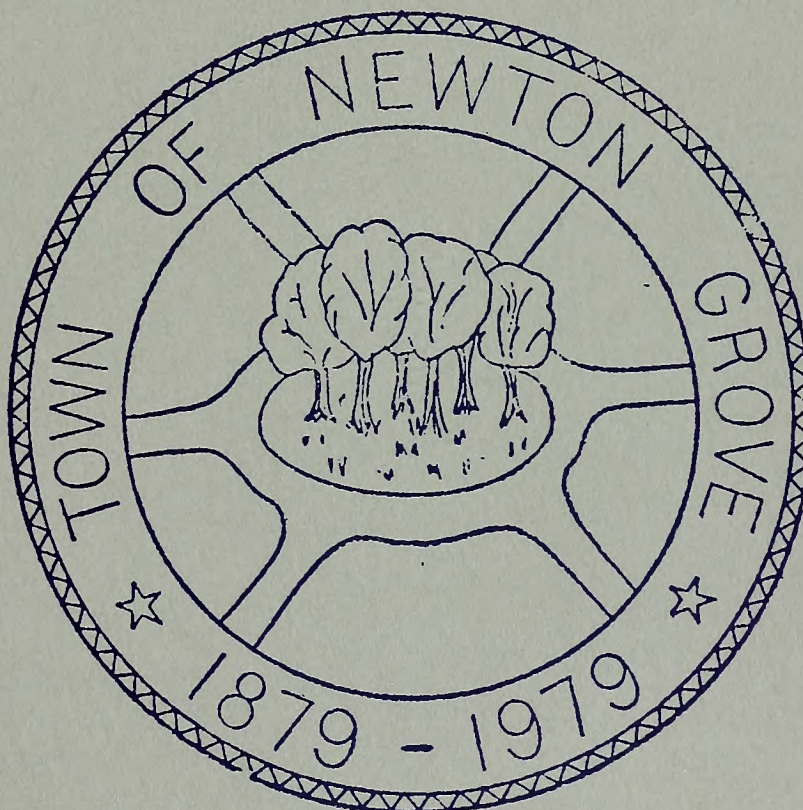
North Carolina Department of Transportation  
Planning and Research Branch  
Statewide Planning

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# Newton Grove Thoroughfare Plan

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July, 1989





**THOROUGHFARE PLAN**  
**FOR THE**  
**TOWN OF NEWTON GROVE**

Prepared by the:

Thoroughfare Planning Unit  
Statewide Planning Group  
Planning and Research Branch  
Division of Highways  
North Carolina Department of Transportation

In Cooperation with:

The Town of Newton Grove  
The Federal Highway Administration  
U.S. Department of Transportation

June 14, 1989

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## I. INTRODUCTION

The Town of Newton Grove is located in the southeastern part of North Carolina within the general region known as the Coastal Plains. It is situated in the northeastern portion of Sampson County, bounded by Clinton, Goldsboro, Smithfield, and Fayetteville. Beginning in June of 1990 Newton Grove will be linked directly to Raleigh and Wilmington via I-40. See Figure 1 for the location of Newton Grove relative to other cities. The construction of interchanges on US 701 and NC 50/55 just outside of the Newton Grove Town Limits will provide the Town with excellent access to I-40.

The Town's economy is largely agricultural, with some industrial and commercial development. Newton Grove is rural in nature, and the majority of the land is open and used for agricultural purposes. Newton Grove has three main industries which provide approximately 500 jobs.

The principles of basic thoroughfare planning, as described in Chapter II, were used to develop this thoroughfare plan. It is based on very general traffic, population, and land use data. Year 2005 average daily traffic (ADT) projections were used to determine capacity deficiencies. Major and minor thoroughfares were located based on field investigations, existing and anticipated land uses, and topographic conditions. The thoroughfare plan is expected to meet traffic demands in Newton Grove for the planning period 1990-2010.

The North Carolina Department of Transportation and the Town of Newton Grove will jointly be accountable for the proposed thoroughfare improvements. Cooperation between the two governmental units is a primary concern. In order to assure coordination of efforts, it is desirable that the thoroughfare plan be formally adopted by the local governing body and the Department of Transportation as provided for in Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina. The Newton Grove Thoroughfare Plan was adopted by the Town of Newton Grove on April 13, 1989. The North Carolina Board of Transportation adopted the plan for the North Carolina Department of Transportation on May 5, 1989.

It should be emphasized that the recommended plan is based on anticipated growth of the urban area as currently perceived. Prior to construction of specific projects, a more detailed study will be required to reconsider development trends and to determine specific locations and design requirements.

FIGURE 1

RALEIGH URBANIZED AREA



I-95

Smithfield

GOLDSBORO URBANIZED AREA



US 158  
23 miles

NH 60/65  
19 miles

MOUNT OLIVE

Clinton

I-40  
77 miles (1 hr 11 min)

NEWTON GROVE

FAYETTEVILLE  
URBANIZED AREA



Apex (37 miles)  
Bechtel  
Duke

NH 55  
20 miles

US 15  
30 miles

US 701  
14 miles

NEWTON GROVE  
GEOGRAPHIC LOCATION

WILMINGTON URBANIZED AREA



## II. THOROUGHFARE PLANNING PRINCIPLES

### OBJECTIVES

Typically, the urban street system occupies 25 to 30 percent of the total developed land in an urban area. Since the system is permanent and expensive to build and maintain, much care and foresight are needed in its development. Thoroughfare planning is the process public officials use to assure the development of the most appropriate street system that will meet existing and future travel desires within the urban area.

The primary aim of a thoroughfare plan is to guide the development of the urban street system in a manner consistent with the changing traffic patterns so needless expense can be averted. A thoroughfare plan will enable street improvements to be made as traffic demands increase, and help eliminate unnecessary improvements. By developing the urban street system to keep pace with increasing traffic demands, a maximum utilization of the system can be attained that will require a minimum amount of land for street purposes. In addition to providing for traffic needs the thoroughfare plan should embody those details of good urban planning necessary to present a pleasing and efficient urban center. The location of present and future population, commercial, and industrial enterprises, significantly affects major street and highway locations. Conversely, the location of major streets and highways within the urban area will influence the urban growth pattern.

Other objectives of a thoroughfare plan include:

1. To provide for the orderly development of an adequate major street system as land development occurs;
2. To reduce travel and transportation costs;
3. To reduce the cost of major street improvements to the public through the coordination of the street system with private action;
4. To enable private interests to plan their actions, improvements, and development with full knowledge of public intent;
5. To minimize disruption and displacement of people and businesses through long range advance planning for major street improvements;
6. To reduce environmental impacts such as air pollution resulting from transportation;
7. To increase travel safety.

Thoroughfare planning objectives are achieved through both:  
1.) improving the operational efficiency of thoroughfares; and  
2.) improving the system efficiency through system coordination and layout.



## OPERATIONAL EFFICIENCY

A street's operational efficiency is improved by increasing the capability of the street to carry vehicular traffic and people. In terms of vehicular traffic, a street's capacity is defined as the maximum number of vehicles which can pass a given point on a roadway during a given time period under prevailing roadway and traffic conditions. Capacity is affected by the physical features of the roadway, nature of traffic and weather.

Physical ways to improve vehicular capacity include street widening, intersection improvements, improving vertical and horizontal alignment, and eliminating roadside obstacles. For example, widening of a street from two to four lanes more than doubles the capacity of the street by providing additional maneuverability for traffic. Impedances to traffic flow caused by slow moving or turning vehicles and adverse effects of horizontal and vertical alignments are thus reduced.

Operational ways to improve street capacity include:

1. Control of access- A roadway with complete access control can often carry three times the traffic handled by a non-controlled access street with identical lane width and number.
2. Parking removal- Increases capacity by providing additional street width for traffic flow and reducing friction to flow caused by parking and unparking vehicles.
3. One-way operation- The capacity of a street can sometimes be increased 20-50%, depending upon turning movements and overall street width, by initiating one-way traffic operations. One-way streets can also improve traffic flow by decreasing potential traffic conflicts and simplifying traffic signal coordination.
4. Reversible lanes- Reversible traffic lanes may be used to increase street capacity in situations where heavy directional flows occur during peak periods.
5. Signal phasing and coordination- Uncoordinated signals and poor signal phasing restrict traffic flow by creating excessive stop-and-go operation.

Altering travel demand is a third way to improve the efficiency of existing streets. Travel demand can be reduced or altered in the following ways:

1. Encourage people to form carpools and vanpools for trips to work and other trip purposes. This reduces the number of vehicles on the roadway and raises the people carrying capability of the street system.
2. Encourage the use of transit and the bicycle mode.
3. Encourage industries, businesses, and institutions to stagger work hours or establish variable work hours for



employees. This will reduce travel demand in peak periods and spread peak travel over a longer time period:

4. Plan and encourage land use development or redevelopment in a more travel efficient manner.

## SYSTEM EFFICIENCY

Another means for altering travel demand is the development of a more efficient system of streets that will better serve travel desires. A more efficient system can reduce travel distances, time, and cost. Improvements in system efficiency can be achieved through the concept of functional classification of streets and development of a coordinated major street system.

### Functional Classification

Streets perform two primary functions-- traffic service and land service, which when combined, are basically incompatible. The conflict is not serious if both traffic and land service demands are low. However, when traffic volumes are high, conflicts created by uncontrolled and intensely used abutting property lead to intolerable traffic flow friction and congestion.

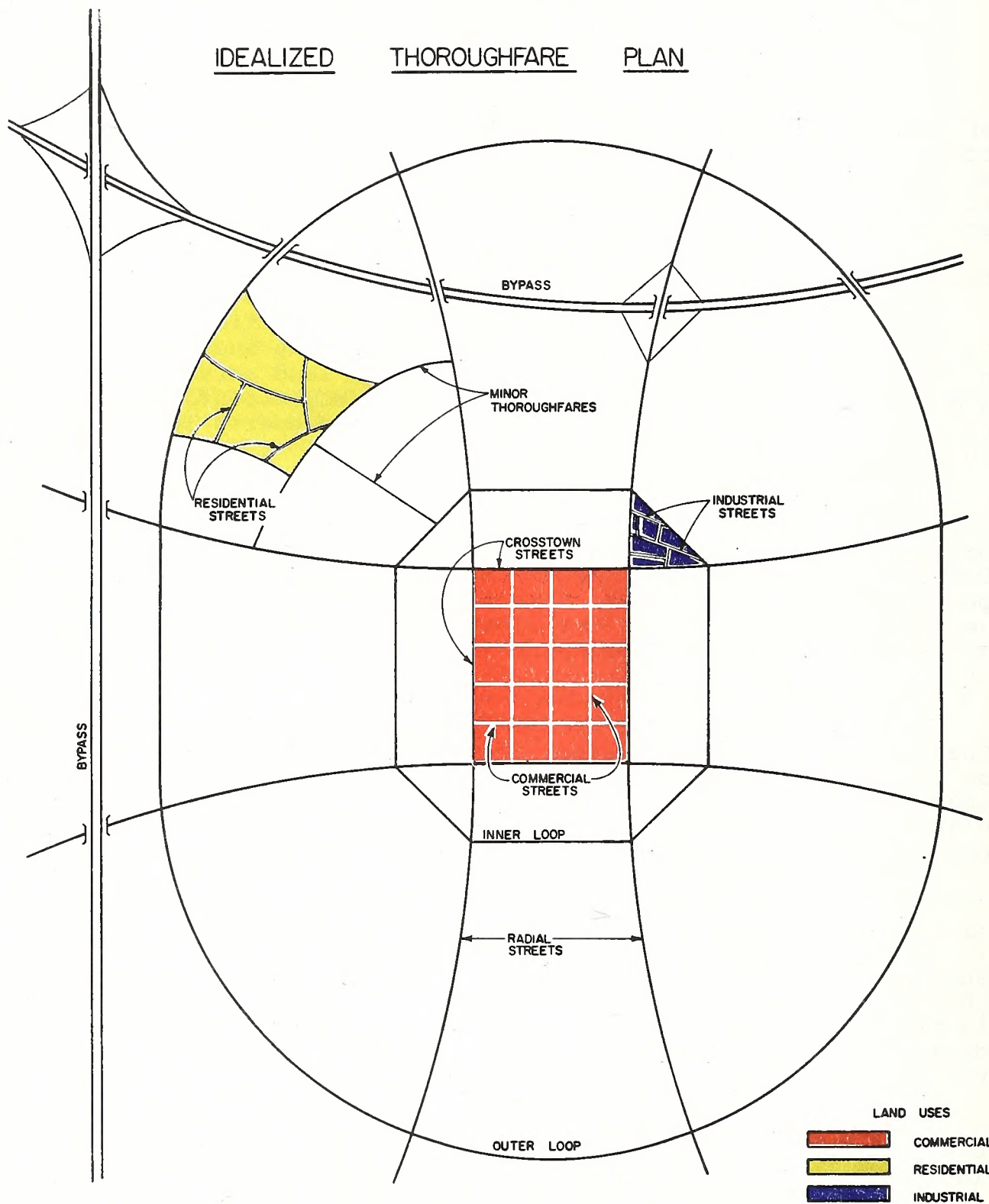
The underlying concept of the thoroughfare plan is that it provides a functional system of streets which permits travel from origins to destinations with directness, ease, and safety. Different streets in the system are designed and called on to perform specific functions, thus minimizing the traffic and land service conflict. Streets are categorized as to function as local access streets, minor thoroughfares, or major thoroughfares (See Figure 1).

Local Access Streets provide access to abutting property. They are not intended to carry heavy volumes of traffic and should be located such that only traffic with origins and destinations of the streets would be served. Local streets may be further classified as either residential, commercial, and/or industrial depending upon the type of land use which they serve.

Minor Thoroughfares are more important streets on the city system. They collect traffic from local access streets and carry it to the major thoroughfare system. They may in some instances supplement the major thoroughfare system by facilitating minor through traffic movements. A third function which may be performed is that of providing access to abutting property. They should be designed to serve limited areas so that their development as major thoroughfares will be prevented.

Major Thoroughfares are the primary traffic arteries of the city. Their function is to move intra-city and inter-city traffic. The streets which comprise the major thoroughfare system may also serve abutting property, however, their function is to carry traffic. They should not be bordered by uncontrolled strip development because such development significantly lowers the capacity of the thoroughfare to carry traffic and each driveway is a danger and an impediment to traffic flow. Major thoroughfares

FIGURE 2





may range from a two-lane street carrying minor traffic volumes to major expressways with four or more traffic lanes. Parking normally should not be permitted on major thoroughfares.

### Idealized Major Thoroughfare System

A coordinated system of major thoroughfares forms the basic framework of the urban street system. A major thoroughfare system which is most adaptable to desired lines of travel within an urban area and which permits movement between various areas of the city within maximum directness is the radial-loop system. This system consists of several functional elements--radial streets, crosstown streets, loop system streets, and bypasses (Figure 1).

Radial streets provide for traffic movement between points located on the outskirts of the city and the central area. This is a major traffic movement in most cities, and the economic strength of the central business district depends upon the adequacy of this type of thoroughfare.

If all radial streets crossed in the central area, an intolerable congestion problem would result. To avoid this problem, it is very important to have a system of crosstown streets which form a loop around the central business district. This system allows traffic moving from origins on one side of the central area to destinations on the other to follow the area's border and allows central area traffic to circle and then enter the area near a given destination. The effect of a good crosstown system is to free the central area of crosstown traffic, thus permitting the central area to function more adequately in its role as a pedestrian shopping area.

Loop system streets move traffic between suburban areas of the city. Although a loop may completely encircle the city, a typical trip may be from an origin near a radial thoroughfare to a destination near another radial thoroughfare. Loop streets do not necessarily carry heavy volumes of traffic, but they function to help relieve central areas. There may be one or more loops, depending on the size of the urban area, and they are generally spaced one-half mile to one mile apart, depending on the intensity of land use.

A bypass is designed to carry traffic through or around the urban area, thus providing relief to the city street system by removing from it traffic which has no desire to be in the city. Bypasses are usually designed to through-highway standards, with control of access. Occasionally, a bypass with low traffic volume can be designed to function as a portion of an urban loop. The general effect of bypasses is to expedite the movement of through traffic and to improve traffic conditions within the city. By freeing the local streets for use by shopping and home-to-work traffic, bypasses tend to increase the economic vitality of the local area.

### Application of Thoroughfare Planning Principles:

The concepts presented in the discussion of operational efficiency, functional classification, and idealized major thoroughfare system are the conceptual tools available to the transportation planner in developing a thoroughfare plan. In actual practice, thoroughfare planning is done for established urban areas and is constrained by the existing land use and street patterns, existing public attitudes and goals, and current expectations of future land use. Compromises must be made because of these and the many other factors that affect major street locations.



### III. EXISTING CONDITIONS

#### EXISTING STREET SYSTEM

The primary highways serving Newton Grove are US 701, US 13 and NC 50/55. US 701 is a major north-south route in Southeastern North Carolina. All three routes converge at Weeks Circle in the center of Town. Beginning in the summer of 1990 Newton Grove will be served by I-40 via interchanges at US 701 and NC 50/55. These interchanges are 2.3 miles apart and within Newton Grove's one mile extraterritorial zoning jurisdiction. SR 1701 is Newton Grove's only other major thoroughfare. SR 1701 links US 13 and NC 50/55 directly to the I-40 interchange at US 701. An important crosstown minor thoroughfare is Old Goldsboro Road.

#### EXISTING LAND USE

Agricultural and open land represent the largest blocks of land use in the Newton Grove area. Residential land uses represent the next largest land use in the Newton Grove Planning Area. Individual houses are scattered throughout the planning area. Though no historic sites are present within the Town Limits, there is one historic site that is of some concern in the planning area. The Issac Williams Historic House is located on NC 55 at the intersection of NC 50.

Commercial, public, and institutional land uses represent the next largest combined area in Newton Grove. Besides commercial uses, this category includes churches, cemeteries, parks, and public buildings. Commercial sites are concentrated adjacent to and near Weeks Circle. Public and institutional uses are found mostly in the center of Town, with the only park located on US 701 near the southern Town Limits.

Industrial uses represent a small percentage of the total acreage of the Newton Grove Planning Area. An existing industrial site is located south of Town on US 701. Two other major industries are located near the center of Town.

#### FUTURE LAND USE

Trying to predict the future land use of an area is, by the most part, a seemingly difficult task. At best, one can only recognize those portions of land that are likely to be developed in the near future. The economy, transportation system, and local governments have a large role in determining the locations of future land use. With a good transportation plan in place Newton Grove has a better chance in guiding the growth of the area. With that in mind one can be fairly comfortable in saying that Newton Grove is likely to grow to the south and west of Town toward Interstate 40.

The land near the interchanges will most likely to be developed as highway retail. With the exception of two swampy

areas, the land between the interchanges, and adjacent to the interstate is prime commercial/industrial land. Future growth will concentrate in these areas and along NC 50. Newton Grove officials should take proper measures to guide the growth in these areas so that the conflicts between land use and transportation needs will be lessened.

#### ECONOMY AND EMPLOYMENT

Newton Grove's economy is mainly agriculturally based. A major crop is sweet potatoes, and the growing season is highlighted by a sweet potato festival in the fall of each year.

Newton Grove has two major industries within the Town limits. Hemco, Inc. makes clothing and employs some 150 persons. Newton Grove's largest employer is Hog Slat, Inc. with 250 employees. Located outside of the Town Limits at the US 701/I-40 interchange is Devil Dog, Inc. Devil Dog is an apparel maker with about 150 employees.

#### POPULATION TRENDS

Based on the historical data shown in Table 1, one would not expect the Newton Grove population to grow very much. In fact, the population of Newton Grove has only grown slightly in the past twenty years. A major development is occurring that will serve to change the pattern of growth in the Newton Grove Area. That development is the construction of Interstate 40 from Raleigh to Wilmington. Interstate 40 comes within one and half miles of the Newton Grove Town Limits. This prime location, as well as the excellent availability of open land and public utilities suggests that Newton Grove's population will increase at a faster rate than in the past and should double to 1160 persons by the year 2010.

**TABLE 1 POPULATION TRENDS AND PROJECTIONS**

	1950	1960	1970	1980	1990	2000	2010
Newton Grove	374	477	546	564	583	822	1,160
Newton Grove Twp	1,961	1,941	1,811	1,904	2,000	2,560	3,278
Sampson County	49,780	48,013	44,954	49,687	51,030	51,508	51,304

#### TRAVEL DEMAND

Travel demand is generally reported in the form of ADT counts. Traffic counts are taken regularly at several locations in the Newton Grove Planning Area by the North Carolina Department of Transportation.

A comparison of annual growth rates from 1973 to 1988 at the various count locations in Newton Grove shows average annual growth rates ranging from 0.9% to 6.5%. The largest growth was noted on US 701 north of Town. Figure 3 shows historical and projected average traffic volumes for streets in the Newton Grove Area based on past trends and expected growth in the area.



## FUTURE TRAVEL ANALYSIS

To estimate future travel demand, traffic trends over the past fifteen years were studied. US 701 and NC 50 carry a large percentage of the through trips through Newton Grove. Once I-40 opens these routes will experience some initial decrease in traffic due to a loss of through trips. US 13 functions as a major connector between Fort Bragg in Fayetteville and Pope Air Force Base in Goldsboro. I-40 should have little effect on this route except to add additional traffic on US 13 between Newton Grove and Goldsboro. Industrial and retail growth are expected to occur near the I-40 interchanges and along the proposed frontage roads abutting I-40. Growth in traffic will occur fastest on US 701 and NC 50/55 from Weeks Circle to I-40. SR 1701 will serve as a connector from US 13, across NC 50/55, to the I-40 and US 701 interchange and traffic will grow on this route at a rapid rate. Normal to moderate growth in traffic is expected to occur on Newton Grove's other major and minor thoroughfares.

## TRAFFIC ACCIDENTS

Traffic accident analysis is a serious and important consideration in thoroughfare plan development. The source of traffic accidents can be broken down into three general categories. The first is the physical environment which includes such things as road condition, weather, road obstructions, and traffic conditions. The second source is associated with the driver. This includes the driver's mental alertness, distractions in the car, ability to handle the vehicle, and reaction time. The third source is associated with the physical attributes of the vehicle itself. This would include such things as the condition of the brakes and tires, vehicle responsiveness, size of the vehicle, and how well the windshield wipers and defroster work. All traffic accidents can be attributed to one or more of these sources, however the driver is often the primary source.

Accident data for January 1984 through December 1988 as shown in Table 2 was studied as part of the development of this report. The largest accident count for a single intersection in Newton Grove was found at Weeks Circle where US 701, US 13 and NC 50/55 come together. The accident rate for this area is not extremely high and is a result of the high number of through and truck traffic that uses US 701 and US 13. Weeks Circle operates at a much better level of service than a signal would, and thus no changes are recommended at this time. Once I-40 opens the through traffic, and a majority of the trucks will be removed from this intersection and the accident rate should decrease.

**Table 2 Accident Data**

INTERSECTION	# of Accidents
US 701 @ US 13 and NC 50/55 at Weeks Circle	22
US 701 @ Circle Street	6
US 13 @ McClamb Road	4







## TOWN OF NEWTON GROVE

SAMPSON COUNTY

NORTH CAROLINA

### FIGURE 3

### HISTORICAL AND FUTURE AVERAGE DAILY TRAFFIC

### THOROUGHFARE PLAN

MARCH 15, 1989

ADOPTED BY TOWN OF NEWTON GROVE  
APRIL 13, 1989

RECOMMENDED APPROVAL BY  
PLANNING RESEARCH BRANCH  
APRIL 18, 1989 *M.R.M.*

ADOPTED BY NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
MAY 5, 1989

PUBLIC HEARING  
MARCH 14, 1989



1976 ADT  
1988 ADT  
2005 ADT

#### LEGEND

MAJOR THOROUGHFARE  
MINOR THOROUGHFARE

EXISTING  
PROPOSED



1. 1000  
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#### IV. THOROUGHFARE PLAN DEVELOPMENT

In June of 1988 the North Carolina Department of Transportation was contacted by the Region M Council of Government asking thoroughfare planning assistance for the Town of Newton Grove. Region M had been assisting the Town in various planning efforts brought on by the advent of I-40. The need for a thoroughfare plan was recognized by a task force that was studying ways to enhance Newton Grove Development.

#### MEETING SCHEDULE

In August of 1988 Statewide Planning Staff met with two local officials. At that meeting the importance of having a thoroughfare plan was discussed. Also discussed was the existing road system and some of its deficiencies. The future road system was discussed; and more specifically, the effect that I-40 would have on Newton Grove. The local officials were concerned that businesses within the Town would suffer because of the decline in travel around Weeks Circle. However, the Town recognizes the benefits of having I-40 literally at their doorstep and is looking forward to the growth that will occur as a result of it. Without careful planning though, when a new highway is built, development occurs only at the interchanges and blocks any hopes of convenient access to the land between the interchanges. Newton Grove has two interchanges with I-40 and many acres of prime land between them. As such, a thoroughfare plan is needed to ensure that their future road system is planned efficiently to maximize land access. At the conclusion of our meeting with the Town, the Town Officials requested that Statewide Planning Staff make a presentation to the Town Board since it is important that the Board participate in any planning effort.

In September of 1988, Statewide Planning made a presentation to the Newton Grove Town Board concerning the advantages of having a thoroughfare plan. We stressed the fact that the Town was going to grow and it was important for them to be prepared for that growth. In October, the Newton Grove Town Board passed a resolution requesting that Statewide Planning work with the Town to develop a thoroughfare plan.

The groundwork for the basic transportation plan had already been established at our two previous meetings with the Town. In November a field trip was made to more precisely locate the new thoroughfares. At that time, the exact location of the swampy areas were determined and intersection spacing for the frontage roads were laid out. In December we presented our recommendations to the Town Board. They included the improvements to SR 1701 and the Northern and Southern frontage roads. We stressed the importance of preserving the frontage road corridors as a means of maximizing the land between the US 701 at I-40 and the NC 50/55 at I-40 interchanges. With the Town Board's verbal approval of the proposed plan we asked for permission to hold a public forum to solicit informal comments from the citizens of Newton Grove.

## PUBLIC INVOLVEMENT

A public forum was held in January of 1989 and about twenty people attended. Most of the people were there to see how the new thoroughfares might affect their property. Most stated positive comments about the proposed plan. Several expressed specific problems with the placement of certain new thoroughfares. As a result of the public forum, portions of both frontage roads were adjusted slightly, but the rest of the proposed plan remained intact.

On March 14, 1989 a public hearing on the Newton Grove Proposed Thoroughfare Plan was held for the Town Board to hear comments from its citizens. Most comments at that time were favorable. However, concerns were once again raised about the location of the southern frontage road. The public hearing was continued until their next board meeting while minor adjustments to the southern frontage road were made. On April 13, 1989 the Newton Grove Town Board unanimously adopted the Newton Grove Thoroughfare Plan.



## V. RECOMMENDATIONS

As discussed in Chapter II, all thoroughfares are classified as major or minor thoroughfares. These can function as bypasses, loops, radials, or crosstown facilities. The following shows the application of this system to the recommended 1989 thoroughfare plan for Newton Grove. More detail on the operational and physical characteristics of these thoroughfares is given in Table 1 of Appendix A.

### Major Thoroughfares

US 701 serves as a major north-south route linking Smithfield to the north with Clinton to the South. Its primary function is to serve pass through traffic. In the future, it will serve to collect traffic from the north and deposit it on I-40. North of Town, and within the Town Limits, US 701 is adequate to meet future needs. In the future, a three lane section will need to be constructed from the southern Town Limits to I-40. See Table 3 on the next page for recommended cross section and cost estimate.

US 13 serves as a major route between Fayetteville and Goldsboro. While US 13 south toward Fayetteville typically carries one of the highest volumes of traffic in the Newton Grove area (4100 ADT) it operates under capacity and is adequate to meet future travel desires.

NC 50/55 connects Mt. Olive with Dunn and Benson. The existing right of way is adequate for future needs. As development occurs, NC 50/55 between Weeks Circle and I-40 will need to be widened to a three lane section. As traffic increases a signal will be needed at the intersection of NC 50 and NC 55. This intersection should be monitored until it meets signal warrants.

SR 1701 (Bryant-Westbrook Rd.) connects US 13 and NC 50/55 to the I-40 on ramp at US 701. Recommend that the intersection of SR 1701 and NC 50/55 be improved and that the section between NC 50/55 and US 701 be widened.

Concerns- The construction of a new interstate brings with it many challenges. One of the toughest tasks facing the leaders of Newton Grove is the guidance of growth in the interchange areas. Care must be taken to ensure that an orderly pattern of development occurs along US 701 and NC 50/55 and that these routes do not get overburdened with excess driveways.

### Minor Thoroughfares

Bizzel Street will connect into the northern service road and will serve as a connector from SR 1703 to US 701. A minor connector is needed to improve the access of Bizzel Street with the northern frontage road.

SR 1703 (Old Goldsboro Road and McClamb Road) is a low volume road that parallels US 13 and serves to carry traffic around the main part of Newton Grove. Its intersections with US 13 and US 701 are badly skewed and when traffic increases improvements at these intersections will become necessary.

SR 1702 and SR 1651 will be connected by a new minor thoroughfare and will serve as a Northern Loop facility.

SR 1704 (Irwin Road) connects US 13 with US 701. The extension of Irwin Road from SR 1703 to US 701 will allow travelers a more continuous route.

Southern Frontage Road will utilize SR 1800 to serve as a continuous service road from US 701 at Devil Dog, Inc. to NC 50/55 at NC 50 on the southern side of I-40. While the main purpose of the frontage roads are to service the land, they will serve another important function. They will add continuity to Newton Grove's transportation system and will save travel time by allowing travelers on US 13 and Old Goldsboro Road west of Town a means of getting to I-40 without having to go through the center of Town.

Northern Frontage Road will serve as a continuous service road from US 701 to SR 1651 on the north side of I-40.

Concerns- The most important part of the system of frontage roads are their intersections with the major thoroughfares. These frontage roads will serve the important purpose of accessing the valuable land between the major roads. Proper allowances should be made to ensure that these intersections are preserved.

#### CONSTRUCTION IMPROVEMENTS AND COST ESTIMATES

Construction priorities will vary depending on what criteria are considered and what weight is attached to the different criteria. Most people would agree that improvements to the major thoroughfare system and major traffic routes would be more important than minor thoroughfares where traffic volumes are lower. To be in the State's Transportation Improvement Program, a project must show favorable benefits relative to costs and should not be prohibitively disruptive to the environment. Based on these considerations the improvements shown in Table 3 are recommended. Newton Grove is fortunate in that it is adjacent to a newly constructed freeway. Except for a few minor improvements, its major thoroughfare system is adequate to serve the future needs of the planning area. Concentration and effort must be given to the use of local measures to preserve the ROW for the proposed minor thoroughfares.

**TABLE 3** Construction Improvements and Cost Estimates

Project	Recommended X-Section	Construction Cost (1000's)	Right-of- Way Cost (1000's)	Total Cost (1000's)
US 701 S- from Town Limits to I-40	40' (1)	2,120	64	2,184
NC 50/55- from NC 50 to Weeks Circle	40' (1)	429	35	464
SR 1701 from NC 50/55 to US 701	28' (2)	600	10	610
Northern Frontage Road	28' (2)	2,650	150	2,800
Southern Frontage Road	28' (2)	1,600	100	1,700

(1) Curb and Gutter Section- Measured from face of curb

(2) Shoulder Section- Measured from edge of pavement





# **TOWN OF NEWTON GROVE** SAMPSON COUNTY NORTH CAROLINA

THOROUGHFARE PLAN  
MARCH 15, 1989

ADOPTED BY TOWN OF NEWTON GROVE APRIL 13, 1989  
RECOMMENDED APPROVAL BY PLANNING RESEARCH BRANCH APRIL 28, 1989 *m.r.h.*  
ADOPTED BY NORTH CAROLINA DEPARTMENT OF TRANSPORTATION MAY 5, 1989  
PUBLIC HEARING MARCH 14, 1989

FIGURE 4



0 500 1000 2000 3000  
SCALE: 1" = 1000'

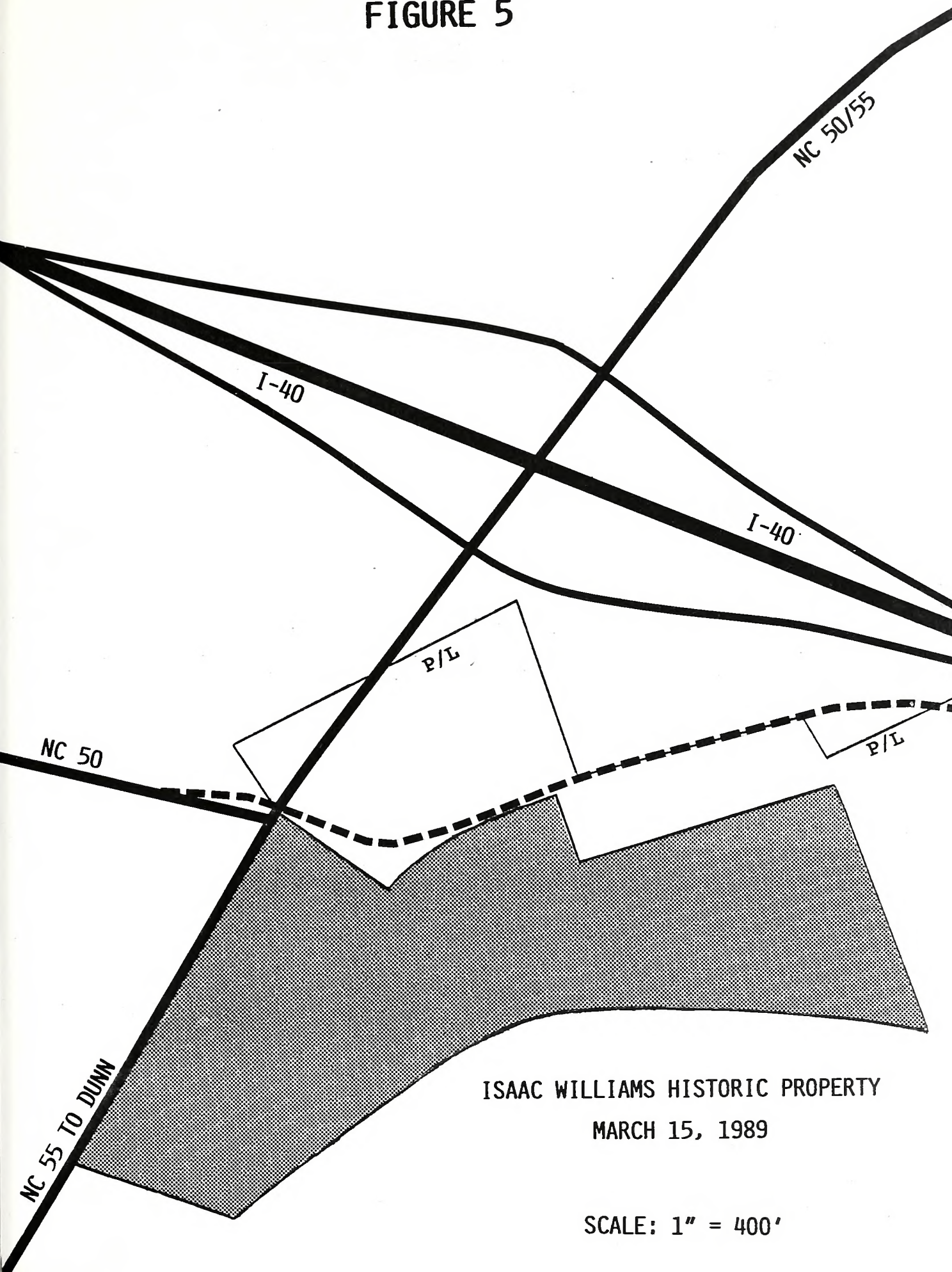
## LEGEND

MAJOR THOROUGHFARE	EXISTING	PROPOSED
MINOR THOROUGHFARE		





FIGURE 5







## VI. IMPLEMENTATION

There are several tools which are available for implementation of the thoroughfare plan. They are as follows:

### STATE AND LOCAL MUTUAL ADOPTION OF THE THOROUGHFARE PLAN

Chapter 136, Article 3A, Section 136-66.2 of the General Statutes of North Carolina provide that after development of a thoroughfare plan, the plan may be adopted by the governing body of the municipality and the Department of Transportation to serve as the basis for future street and highway improvements. The General Statutes also require that, as part of the plan, the governing body of the municipality and Department of Transportation shall reach agreement on responsibilities for existing and proposed streets and highways included in the plan. Facilities which are designated a State responsibility will be constructed and maintained by the Division of Highways. Facilities which are designated a municipal responsibility will be constructed and maintained by the municipality.

After mutual plan adoption, the Department of Transportation will initiate negotiations leading to determining which of the existing and proposed thoroughfares will be a Department responsibility and which will be a municipal responsibility. Chapter 136, Article 3A, Section 136-66.1 of the General Statutes provides guidance in the delineation of responsibilities. In summary, these statutes provide that the Department of Transportation shall be responsible for those facilities which serve volumes of through traffic and traffic from outside the area to major business, industrial, governmental, and institutional destinations located inside the municipality. The municipality is responsible for those facilities which serve primarily internal travel.

Thoroughfare plan adoption enables other planning tools such as the subdivision ordinance, zoning ordinance, official street map, and capital improvement program to be used to assist in plan implementation and thus minimize public cost and land use disruption.

### SUBDIVISION CONTROL

A subdivision ordinance requires that every subdivider submit to the Town Planning Commission a plot of his proposed subdivision. Certain standards must be met by the developer before he can be issued a building permit to construct his development. Through this process, it is possible to reserve or protect the essential rights of way for proposed streets which are a component of the thoroughfare plan and to require street construction in accordance with the plan.

Since some of the proposed thoroughfares are outside the existing Newton Grove Corporate Limits, it is recommended that additional building setbacks and/or right-of-way reservation, conforming to the Thoroughfare Plan also be applied in the extraterritorial jurisdiction area. This will allow for orderly implementation of the plan in Newton Grove's fringe areas without disruption to adjoining land owners.

Streets which may be partially built, wholly built, or improved through the use of the subdivision ordinance are: Northern Loop, Northern and Southern Frontage Roads.

#### OFFICIAL STREET MAP

A municipality may, through special enabling legislation, adopt an official street map which indicates both existing and future street lines. No new construction or reconstruction of structures would be permitted within the designated future street lines. This would, over a period of time, reduce the cost of additional right of way along densely developed thoroughfares which will require widening at some future date. Future street lines should be established to provide for the ultimate right of way specified in Appendix A. US 701 will become an important facility in the future and would benefit from an official street map with specified setback distances.

#### ZONING

A zoning ordinance can be beneficial to thoroughfare planning in that planned locations of various land uses and planned densities of dwellings can be realized. This provides a degree of stability on which to make future traffic projections and to plan streets and highways.

Other benefits of a good zoning ordinance are: (1) the establishment of standards of development which will aid traffic operations on major thoroughfares, and (2) the minimization of strip commercial development which creates traffic friction and increases the traffic accident potential.

The zoning ordinance should be structured to control strip development along the major traffic-carrying thoroughfares. Streets within the planning area that are either experiencing strip development pressures, or that are expected to in the future include: US 701 south of Town, and NC 50 and NC 55 west of Town.

#### URBAN RENEWAL

Urban renewal is the term used to describe the removal of slums and allows for corrections to basic problems in the street system layout and design.

To qualify for community development funds or discretionary funds, a city must first prepare a community development program. Urban areas compete throughout the state on the basis of demographic points which consider such conditions as percent of substandard housing, people per square feet of housing, dwelling age, etc.

An effort should be made to ensure that community development and transportation plans are compatible.

#### ROADWAY CORRIDOR OFFICIAL MAP

The North Carolina Statutes 136-44.50 through 133-44.53 are collectively designated as the "Roadway Corridor Official Map



Act". For cities contemplating the adoption of a Roadway Corridor Map, more commonly referred to as Official Map, there are several things to consider prior to implementation. First and foremost, it should be recognized that Official Map designation places severe but temporary restrictions on private property rights. These restrictions in the form of a prohibition, for a period of up to three years, on the issuance of building permits or the approval of subdivisions on property lying within an Official Map alignment. This pushes local governmental powers to new limits. Consequently, this new authority should be used carefully and only in cases where less restrictive powers are found to be ineffective.

The statute establishing the Official Map authority is fairly explicit in outlining the procedures to be followed and the types of projects to be considered of Official Map designation. As required by statute, a project being considered for an Official Map must be programmed in the State's Transportation Program (TIP) **or** included in a locally adopted capital improvement plan, in addition to appearing on the adopted street system plan. The statute states that the capital improvement plan must be for a period of ten years or less, and must identify the estimated cost of acquisition and construction of the proposed project as well as the anticipated financing.

The Program and Policy Branch of the Division of Highways is responsible for facilitating the adoption of Official Maps. Cities considering Official Map projects should contact this Branch for their "Guidelines for Municipalities Considering Adoption of Roadway Corridor Maps" at P.O. Box 25201, Raleigh, North Carolina 26611.

#### CAPITAL IMPROVEMENTS PROGRAM

One of the tools which makes it easier to build a planned thoroughfare system is a capital improvements program. This is a long range plan for the spending of money on street improvements, acquisition of rights-of-way, and other capital improvements within the bounds of projected revenues. Municipal funds should be available for construction of street improvements which are a municipal responsibility, right of way cost sharing on facilities designated a Division of Highways responsibility, and advance purchase of right of way where such action is required.

The section of the capital improvements program which deals with the thoroughfare plan requires a fairly detailed knowledge of the costs of various projects.

The improvement groupings in this report should provide a basis on which the Town of Newton Grove can develop their capital improvement program. Some examples of the potential effectiveness of this program follow: Construction of the Northern and Southern Frontage Roads

#### OTHER FUNDING SOURCES

1. User impact fees to fund transportation projects. These fees, called "facility fees" in the legislation, are to



be based upon "reasonable and uniform considerations of capital costs to be incurred by the town as a result of new construction. The facility fee must bear a direct relationship to additional or expanded public capital costs of the community service facilities to be rendered for the inhabitants, occupants of the new construction, or these associated with the development process".

2. Enact a bond issue to fund street improvements.
3. Continue to work with NCDOT to have local projects included in the Transportation Improvement Program (TIP).
4. Consider the possibility of specific projects qualifying for federal demonstration project funds.
5. Collector street plan that would assess buyer or property owners for street improvement.
7. Special assessment of utilities; for example, increase in water and sewer bills to cover cost of street improvement.
8. Agree to bring in a major industry, one that not only increases the tax base but promises new jobs, to qualify for industrial access money from the state.

## APPENDIX A

### Typical Cross Sections

Typical cross sections recommended by the Thoroughfare Planning Unit are shown in Appendix A, Figure 1, and listed in Appendix A, Table 1.

Cross section "A" is illustrative for controlled access freeways. The 46 foot grassed median is the least desirable median width but there could be some variation from this depending upon design considerations. Slopes of 8:1 into 3 foot drainage ditches are desirable for traffic safety. Right-of-way requirements would typically vary upward from 250 feet depending upon cut and fill requirements.

Cross section "B" is typical for four lane divided highways in rural areas which may have only partial or no control of access. The minimum median width for this cross section is 30 feet, but a wider median is desirable. Design requirements for slopes and drainage would be similar to cross section "A", but there may be some variation from this depending upon right-of-way constraints.

Cross section "C", seven lane urban, and cross section "D", five lane urban, are typical for major thoroughfares where frequent left turns are anticipated as a result of abutting development or frequent street intersections.

Cross sections "E" and "F" are used on major thoroughfares where left turns and intersecting streets are not as frequent. Left turns would be restricted to a few selected intersections.

Cross section "G" is recommended for urban boulevards or parkways to enhance the urban environment and to improve the compatibility of major thoroughfares with residential areas. A minimum median width of 24 feet is recommended with 30 feet being desirable.

Typical cross section "H" is recommended for major thoroughfares where projected travel indicates a need for four travel lanes but traffic is not excessively high, left turning movements are light, and right-of-way is restricted. An additional left turn lane would probably be required at major intersections.

Thoroughfares which are proposed to function as one-way traffic carriers would typically require cross section "I". Cross section "J" and "K" are usually recommended for minor thoroughfares since these facilities usually serve both land service and traffic service functions. Cross section "J" would be used on those minor thoroughfares where parking on both sides is needed as a result of more concentrated development.

Cross section "L" is used in rural areas or for staged construction of a wider multilane cross section. On some thoroughfares projected traffic volumes may indicate that two travel lanes will adequately serve travel for a considerable period of time.

The curb and gutter urban cross sections all illustrate the sidewalk adjacent to the curb with a buffer or utility strip between the sidewalk and the minimum right-of-way line. This permits adequate setback for utility poles. If it is desired to move the sidewalk further away from the street to provide added separation for pedestrians or for aesthetic reasons, additional right-of-way must be provided to insure adequate setback for utility poles.

Rights-of-way shown for the typical cross sections are the minimum rights-of-way required to contain the street, sidewalks, utilities, and drainage facilities. Cut and fill requirements may require whether additional right-of-way or construction easements. Obtaining construction easements is becoming the more common practice for urban thoroughfare construction.

If there is sufficient bicycle traffic along the thoroughfare to justify a bicycle lane or bikeway, additional right-of-way may be required to allow for the bicycle facilities. The North Carolina Bicycle Facility and Program Handbook should be consulted for design standards for bicycle facilities.

Recommended typical cross sections for thoroughfares were derived on the basis of projected traffic, existing capacities, desirable levels of service and available right-of-way.



**APPENDIX A TABLE 1**  
**THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS**  
**FOR THE TOWN OF NEWTON GROVE**

FACILITY & SECTION	EXISTING X - SECTION			CAPACITY  CURRENT (FUTURE)	1988 ADTS	2010 ADTS	RECOMMENDED X-SECTION	
	DIST MI	RDWY FT	ROW FT				RDWY (ULT)	ROW (ULT)
US 701								
Kill Swamp - SR 1800 (proposed)	0.38	24	60	9600	3800	7280	( I )	(100)
SR 1800 (prop.) - Cemetery	0.49	36	100	9600	3800	7280	I	ADQ
Cemetery - Town Limit	0.57	24	60	9600	3800	7280	( I )	(100)
Town Limit - Weeksdales Street	0.41	52	100	12500	5700	8950	J	ADQ
Weeksdales - Traffic Circle	0.19	52	100	12500	5700	8950	J	ADQ
Traffic Circle - Old Goldsboro	0.57	52	100	12500	6200	10000	J	ADQ
Old Goldsboro - Town Limit	0.92	24	100	12500	6200	10000	I	ADQ
Town Limit - Johnston County Line	0.50	24	100	9600	3250	6200	L	ADQ
US 13								
Creek - Southern Town Limit	1.00	20	100	6500	2200	3800	L	ADQ
STL - Traffic Circle	0.73	22	100	8000	4100	7850	L	ADQ
Traffic Circle - N. Town Limit	1.14	22	100	8000	2540	5400	L	ADQ
NTL - SR 1701	0.82	22	100	8000	2540	5400	L	ADQ
SR 1701 - Planning Boundary	0.18	22	100	8000	2540	5400	L	ADQ
NC 50								
Planning Boundary - New Location	1.04	20	100	6500	2200	4700	( I )	ADQ
New Location - NC 55*	0.06	-	-	(8000)	-	(4700)	( I )	(100)
NC 55 - Town Limit	0.43	22	100	8000	3500	7400	( I )	ADQ
Town Limit - Traffic Circle	1.14	20	100	6500	3700	7890	( I )	ADQ
Traffic Circle -	0.40	32	100	8000	4000	7600	I	ADQ
- Town Limit	0.30	20	100	6500	4000	7600	( I )	ADQ
Town Limit - SR 1701	0.12	20	100	6500	2500	4700	L	ADQ
SR 1701 - Planning Boundary	0.97	20	100	6500	2500	4700	L	ADQ
SR 1701								
US 701 - New Location	0.92	18	60	5000	600	1500	( L )	ADQ
New Location - NC 50/55*	0.06	-	-	(8000)	-	(1500)	( L )	( 60)
NC 50/55 - SR 1701*	0.06	-	-	(8000)	-	(1500)	( L )	( 60)
SR 1701 - US 13	1.64	18	60	5000	600	1500	( L )	ADQ
US 13 - SR 1702	0.30	18	60	5000	600	1500	( L )	ADQ
SR 1702 - Planning Boundary	0.19	20	60	6500	600	1500	( L )	ADQ
SR 1702/SR1651 (Northern Loop)								
SR 1701 - SR 1700	1.00	18	60	5000	200	500	( L )	ADQ
SR 1700 - US 701*	0.08	-	-	(8000)	-	(500)	( L )	( 60)
US 701 - SR 1649*	0.41	-	-	(8000)	-	(500)	( L )	( 60)
SR 1649 - New Location	0.80	20	60	5000	100	500	( L )	ADQ
Bizzell Street								
SR 1703 - New Location	0.33	18	60	4000	200	400	( I )	ADQ
New Location - SR 1651*	0.08	-	-	(6000)	-	(400)	( I )	( 60)

**APPENDIX A TABLE 1 cont'd**  
**THOROUGHFARE PLAN STREET TABULATION AND RECOMMENDATIONS**  
**FOR THE TOWN OF NEWTON GROVE**

FACILITY & SECTION	EXISTING X - SECTION			CAPACITY  CURRENT (FUTURE)	1988 ADTS	2010 ADTS	RECOMMENDED X-SECTION	
	DIST MI	RDWY FT	ROW FT				RDWY (ULT)	ROW (ULT)
SR 1703								
SR 1701 - Town Limit	0.80	20	60	6500	400	1000	( L )	ADQ
Town Limit - SR 1704	0.86	20	100	6500	400	1000	( L )	ADQ
SR 1704 - US 701	0.19	20	100	6500	400	1000	( L )	ADQ
US 701 - NC 50/55	0.40	18	60	5000	400	1000	( L )	ADQ
NC 50/55 - US 13	0.35	18	60	5000	400	1000	( L )	ADQ
US 13 - Town Limit	0.27	18	60	5000	1100	2350	( L )	ADQ
Town Limit - I-40	0.30	22	60	6500	1100	2350	( L )	ADQ
I-40 - Planning Boundary	0.66	18	60	5000	1100	2350	( L )	ADQ
					1100	2350	( L )	ADQ
SR 1704 (Irwin Drive)								
US 13 - SR 1703	0.44	18	60	5000	200	450	( L )	ADQ
SR 1703 - US 701*	0.16	-	-	(6500)	-	(450)	( L )	( 60 )
Southern Frontage Road (SR 1800)								
US 701 - SR 1800*	0.15	-	-	(8000)	-	1200	( L )	( 60 )
SR 1800 - New Location	0.66	20	60	6500	200	1200	( L )	ADQ
New Location - SR 1703*	0.42	-	-	(8000)	-	1200	( L )	( 60 )
SR 1703 - New Location	0.34	20	60	6500	200	1200	( L )	ADQ
New Location - US 13*	0.12	-	-	(8000)	-	1200	( L )	( 60 )
US 13 - NC 50/55*	1.06	-	-	(8000)	-	1200	( L )	( 60 )
Northern Frontage Road								
SR 1651 - NC 50/55*	1.28	-	-	(8000)	-	1500	( L )	( 60 )
NC 50/55 - US 13*	0.95	-	-	(8000)	-	1500	( L )	( 60 )
US 13 - SR 1703*	0.26	-	-	(8000)	-	1500	( L )	( 60 )
SR 1703 - US 701*	0.68	-	-	(8000)	-	1500	( L )	( 60 )

\* section on new location

**APPENDIX B**  
Recommended Definitions and Design Standards  
for Subdivision Ordinances

Definitions:

I. Streets and Roads:

A. Rural Roads

1. Principal Arterials - A rural link in a network of continuous routes serving corridor movements having trip length and travel density characteristics indicative of substantial statewide or interstate travel and existing solely to serve traffic. This network would consist of Interstate routes and other routes designated as principal arterials.
2. Minor Arterials - A rural link in a network joining cities and larger towns and providing intrastate and intercounty service at relatively high overall travel speeds with minimum interference to through movement.
3. Major Collector - A road which serves major intracounty travel corridors and traffic generators and provides access to the Arterial system.
4. Minor Collector - A road which provides service to small local communities and links the locally important traffic generators with their rural hinterland.
5. Local Road - A local road that serves primarily to provide access to adjacent land and for travel over relatively short distances.

B. Urban Streets

1. Major Thoroughfares - Major thoroughfares consist of Interstate, other freeway, express-way, or parkway links, and major streets that provide for the expeditious movement of high volumes of traffic within and through urban areas.
2. Minor Thoroughfares - Minor thoroughfares are important streets in the city system and perform the function of collecting traffic from local access streets and carrying it to the major thoroughfare system. Minor thoroughfares may be used to supplement the major thoroughfare system by facilitating a minor through-traffic movement and may also serve abutting property.
3. Local Street - A local street is any link not on a higher-order urban system and serves primarily to provide direct access to abutting land and access to higher systems.



## C. Specific Type Rural or Urban Street

1. Freeway, expressway, or parkway - Divided multi-lane roadways designed to carry large volumes of traffic at relatively high speeds. A freeway is a divided highway providing for continuous flow of vehicles with no direct access to abutting property or streets and with access to selected crossroads provided via connecting ramps. An expressway is a divided highway with full or partial control of access and generally with grade separations at major intersections. A parkway is a highway for non-commercial traffic, with full or partial control of access, and usually located within a park or a ribbon of park-like development.
2. Residential Collector Street - A local access street which serves as a connector street between local residential streets and the thoroughfare system. Residential collector streets typically collect traffic from 100 to 400 dwelling units.
3. Local Residential Street - Cul-de-sacs, loop streets less than 2500 feet in length, or streets less than one mile in length that do not connect thoroughfares, or serve major traffic generators, and do not collect traffic from more than 100 dwelling units.
4. Cul-de-sac - A short street having but one end open to traffic and the other end being permanently terminated and a vehicular turnaround provided.
5. Frontage Road - A local street or road that is parallel to a full or partial access controlled facility and functions to provide access to adjacent land.
6. Alley - A strip of land, owned publicly or privately, set aside primarily for vehicular service access to the back side of properties otherwise abutting on a street.

## II. Property

- A. Building Setback Line - A line parallel to the street in front of which no structure shall be erected.
- B. Easement - A grant by the property owner for use by the public, a corporation, or person(s), of a strip of land for a specific purpose.
- C. Lot - A portion of a subdivision, or any other parcel of land, intended as a unit for transfer of ownership or for development or both. The word "lot" includes the words "plat" and "parcel".

1. Corner Lot - A lot abutting upon two streets at their intersection.
2. Double-Frontage Lot - A continuous (through) lot which is accessible from both of the parallel streets upon which it fronts.
3. Reverse-Frontage Lot - A continuous (through) lot which is accessible from only one of the parallel streets upon which it fronts.

### III. Subdivision

- A. Subdivider - Any person, firm, corporation or official agent thereof, who subdivides or develops any land deemed to be a subdivision.
- B. Subdivision - All divisions of a tract or parcel of land into two or more lots, building sites, or other divisions for the purpose, whether immediate or future, of sale or building development, and all divisions of land involving the dedication of a new street or a change in existing streets; provided, however, that the following shall not be included within this definition nor subject to these regulations: (1) the combination or recombination of portions of previously platted lots where the total number of lots is not increased and the resultant lots are equal to or exceed the standards contained herein; (2) the division of land into parcels greater than ten acres where no street right-of-way dedication is involved, (3) the public acquisition by purchase of strips of land for the widening or opening of streets; (4) the division of a tract in single ownership whose entire area is no greater than two acres into not more than three lots, where no street right-of-way dedication is involved and where the resultant lots are equal to or exceed the standards contained herein.
- C. Dedication - A gift, by the owner, of his property to another party without any consideration being given for the transfer. Since a transfer of property is involved, the dedication is made by written instrument and is completed with an acceptance.
- D. Reservation - A reservation of land does not involve any transfer of property rights. It simply constitutes an obligation to keep property free from development for a stated period of time.

### Design Standards

#### I. Streets and Roads:

The design of all State maintained streets and roads within Oriental shall be in accordance with the accepted policies of the North Carolina Department of Transportation, Division of Highways,

as taken or modified from the American Association of State Highway and Transportation Officials' (AASHTO) manuals.

The provision of street rights-of-way shall conform and meet the requirements of the thoroughfare plan for Oriental as adopted by the Town of Oriental and the North Carolina Department of Transportation.

The proposed street layout shall be coordinated with the existing street system of the surrounding area. Normally the proposed streets should be the extension of existing streets if possible.

The urban planning area shall consist of that area within the urban planning boundary as depicted on the mutually adopted Oriental Thoroughfare Plan. the rural planning area shall be that area outside the urban planning boundary.

- A. Right-of-Way Widths: Right-of-way widths shall not be less than the following and shall apply except in those cases where right-of-way requirements have been specifically set out in the Thoroughfare Plan.

1.	Rural	Min. Right of Way, Ft.
a.	Principal Arterial	
	Freeways	350
	Other	200
b.	Minor Arterial	100
c.	Major Collector	100
d.	Minor Collector	100
e.	Local Road	*60

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\*The desirable minimum right-of-way is 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate on local residential streets.

		Min. Right of Way, Ft.
2.	Urban	
a.	Major Thoroughfare Other than Freeway and Expressway	90
b.	Minor Thoroughfare	70
c.	Local Street	*60
d.	Cul-de-sac	**Variable

The subdivider will only be required to dedicate a maximum of 100 feet of right-of-way. In cases where over 100 feet of right-of-way is desired, the subdivider will be required only to reserve the amount in excess of 100 feet. On all cases in which right-of-way is sought for an access controlled facility, the subdivider will only be required to make a reservation.



A partial width right-of-way, not less than sixty (600) feet in width, may be dedicated when adjoining undeveloped property that is owned or controlled by the subdivided; provided that the width of a partial dedication be such as to permit the installation of such facilities as may be necessary to serve abutting lots. When the said adjoining property is subdivided, the remainder of the full required right-of-way shall be dedicated.

B. Street Widths: Widths for street and road classifications other than local shall be as required by the Thoroughfare Plan. Width of local roads and streets shall be as follows:

1. Local Residential

- a. Curb and gutter section 26 feet, to face of curb
- b. Shoulder section 20 feet to edge of pavement, 4 foot shoulders

2. Residential Collector

- a. Curb and gutter section 34 feet, face to face of curb
- b. Shoulder section 20 feet to edge of pavement, 6 foot shoulders

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\* The desirable minimum right-of-way is established as 60 feet. If curb and gutter is provided, 50 feet of right-of-way is adequate.

\*\* The right-of-way dimension will depend on radius used for vehicular turnaround. Distance from edge of pavement of turnaround to right-of-way should not be less than distance from edge of pavement to right-of-way on street approaching turnaround.

C. Geometric Characteristics: The standards outlined below shall apply to all subdivision streets proposed for addition to the State Highway system or Municipal Street System. In cases where a subdivision is sought adjacent to a proposed thoroughfare corridor, the requirements of dedication and reservation discussed under Right-of-Way shall apply.

1. Design Speed

The design speeds for subdivision type streets shall be:

Rural	Desirable	(Minimum)		
		Level	Rolling	Mountainous
Minor Collector Roads	60	(50)	(40)	(30)
Local Roads including Residential Collectors and Local Residential	50	(50)*	(40)*	(30)*

## Urban

Major Thoroughfares Other than Freeway or Expressway	60	(50)	(50)	(50)
Minor Thoroughfares	60	(50)	(50)	(40)
Local Streets	40	(40)**	(30)**	(20)**

### 2. Maximum and Minimum Grades

a. The maximum grades in percent shall be:

Design Speed	Level	Rolling	Mountainous
60	2	4	6
50	4	5	7
40	5	6	8
30		9	10
20			12

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\*Based on projected annual average daily traffic of 400-750. In cases where road will serve a very limited area and small number of dwelling units, minimum design speeds can be reduced further.

\*\*Based on projected annual average daily traffic of 50-250.

- b. A minimum grade for curbed streets normally should not be less than 0.5%, a grade of 0.35% may be allowed where there is a high type pavement accurately crowned and in areas where special drainage conditions may control.
- c. Grades for 100 feet each way from intersections should not exceed 5%.
- d. For streets and roads with projected annual average daily traffic less than 250, short grades less than 500 feet long, may be 150% greater.

### 3. Minimum Sight Distances

In the interest of public safety, no less than the minimum sight distance applicable shall be provided in every instance. Vertical curves that connect each change in grade shall be provided and calculated using the following parameters.

(General practice calls for vertical curves to be multiples of 50 feet. Calculated lengths shall be rounded up in each case):



Design Speed, MPH	20	30	40	50	60
Stopping Sight Distance					
Min. Distance, Ft.	150	200	275	350	475
Des. Distance, Ft.	150	200	300	450	650
Min. K* Value For:					
Min. Crest Curve	16	28	55	85	160
Des. Crest Curve	16	28	65	145	300
Min. Sag Curve	24	35	55	75	105
Des. Sag Curve	24	35	60	100	155

#### Passing Sight Distance

Min. Passing Distance, Ft. (2 lane)	1100	1500	1800	2100
Min. K* Value For Crest Vertical Curve	365	686	985	1340

Sight distance provided for stopped vehicles at intersections should be in accordance with "A Policy on Geometric Design of Highways and Streets, 1984".

\*K is a coefficient by which the algebraic difference in grade may be multiplied to determine the length in feet of the vertical curve which will provide minimum sight distance.

- The following table shows the maximum degree of curve and related maximum superelevation (e) for rural roads with no curb and gutter is .08. The maximum rate of superelevation for urban streets with curb and gutter is .06 with .04 being desirable.

Design Speed	Maximum	Minimum Radius (Rounded)	Maximum Degree of Curve (Rounded)
<u>MPH</u>	<u>e*</u>	<u>Feet</u>	<u>Feet</u>
20	.04	125	45.0
30	.04	300	19.0
40	.04	560	10.0
50	.04	925	6.0
60	.04	1410	4.0
20	.06	115	50.0
30	.06	275	21.0
40	.06	510	11.0
50	.06	830	7.0
60	.06	1260	4.5
20	.08	110	53.5
30	.08	250	23.0
40	.08	460	12.5
50	.08	760	7.5
60	.08	1140	5.0

\*e = rate of roadway superelevation, foot per foot

#### D. Intersections

1. Streets shall be laid out so as to intersect as nearly as possible at right angles, and no street should intersect any other street at an angle less than sixty (60) degrees.
2. Property lines at intersections should be set so that the distance from the edge of pavement, of the street turnout, to the property line will be at least as great as the distance from the edge of pavement to the property line along intersecting streets. This property line can be established as a radius or as a sight triangle. Greater offsets from the edge of pavement to the property lines will be required, if necessary, to provide sight distance for the stopped vehicle on the side street.
3. Off-set intersections are to be avoided unless exception is granted by the Division of Highways for intersections involving the State Highway System, or the Planning Board for intersections involving only the municipal street system. Intersections which cannot be aligned should be separated by a minimum length of 200 feet between survey centerlines.

#### E. Cul-de-sacs

Cul-de-sacs, unless exception is granted by the local planning board, shall not be more than five hundred (500) feet in length. The distance from the edge of pavement on the vehicular turnaround to the right-of-way line should not be less than the distance from the edge of pavement to the right-of-way line on the street approaching the turnaround. Cul-de-sacs should not be used to avoid connection with an existing street or to avoid the extension of an important street.

#### F. Alleys

1. Alleys shall be required to serve lots used for commercial and industrial purposes except that this requirement may be waived where other definite and assured provision is made for service access.  
  
Alleys shall not be provided in residential subdivisions unless necessitated by unusual circumstances.
2. The width of an alley shall be at least twenty (20) feet.
3. Dead-end alleys shall be avoided where possible, but if unavoidable, shall be provided with adequate



turnaround facilities at the dead-end as may be approved by the Planning Board.

4. Sharp changes in alignment and grade shall be avoided.

#### G. Permits For Connection To State Roads

An approved permit is required for connection to any existing state system road. This permit is required prior to any construction on the street or road. the application is available at the office of the nearest District Engineer of the Division of Highways.

#### H. Offsets To Utility Poles

Poles for overhead utilities should be located clear of roadway shoulders, preferably a minimum of at least 30 feet from the edge of pavement. In streets with curb and gutter, utility poles shall be set back a minimum distance of 6 feet from the face of curb.

#### I. Wheel Chair Ramps

In accordance with Chapter 136, Article 2A, Section 136-44.14, all street curbs in North Carolina being constructed or reconstructed for maintenance purposed, traffic operations, repairs, correction of utilities, or altered for any reason after September 1, 1973, shall provide wheelchair ramps for the physically handicapped at all intersections where both curb and gutter and sidewalks are provided and at other major points of pedestrian flow.

Wheelchair ramps and depressed curbs shall be constructed in accordance with details contained in the Department of Transportation, Division of Highways, Publication entitled, "Guidelines, Curb Cuts and Ramps for Handicapped Persons".

#### J. Horizontal Width on Bridge Deck

1. The clear roadway widths for new and reconstructed bridges serving 2 lane, 2 way traffic should be as follows:

- a. Shoulder Section Approach

- i. Under 800 ADT Design Year

- Minimum 28 feet width face to face of parapets or rails, or pavement width plus 10 feet, whichever is greater.

- ii. 800-2000 ADT Design Year

- Minimum 34 feet width face to face of parapets or rails, or pavement width plus 12 feet, whichever is greater.

iii. Over 2000 ADT Design Year

Minimum 40 feet

Desirable 44 feet width face to face of parapets or rails.

b. Curb and Gutter Approach

i. Under 800 ADT Design Year

Minimum 24 feet face to face of curbs.

ii. Over 800 ADT Design Year

Width of approach pavement measured face to face of curbs.

Where curb and gutter sections are used on roadway approaches, curbs on bridges shall match the curbs on approaches in height, in width of face to face of curbs, and in crown drop. The distance from face of curb to face of parapet or rail shall be 1'6" minimum, or greater if sidewalks are required.

2. The clear roadway widths for new and reconstructed bridges having 4 or more lanes serving undivided two-way traffic should be as follows:

a. Shoulder Section Approach - Width of approach pavement plus width of usable shoulders on the approach left and right.

Minimum 8 feet

Design 10 feet

b. Curb and Gutter Approach - Width of approach pavement measured face to face of curbs.



FIGURE 3  
PHOTO LOG

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